

Abstract of the Disclosure

Disclosed is method for forming a barrier metal of a semiconductor device. According to the method, a TiSiN layer having an atomic layer thickness is deposited by performing deposition of an SiH₄ layer inside a contact hole of a semiconductor device using an atomic layer deposition process and by performing deposition of a certain precursor layer on the SiH₄ layer. By repetition of this ALD process, the TiSiN layer is thickly formed at a desired thickness. Then, the TiSiN layer is plasma processed under the atmosphere of a nitrogen gas and a hydrogen gas, or an ammonia gas, and thus impurities are removed from the TiSiN layer. Therefore, it is easy to thickly form the TiSiN layer for the barrier metal. It is possible to reduce resistivity of the TiSiN layer to a relatively low level. Thereby, it is possible to decrease a contact resistance of the TiSiN layer and, further, to enhance an electrical characteristic of the semiconductor device.